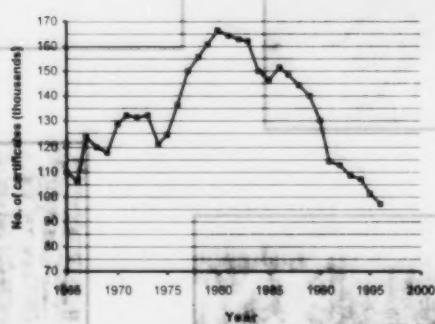




Descriptive analysis of hunting trends in Alberta

B.L. McFarlane, P.C. Boxall, and W.L. Adamowicz

Northern Forestry Centre
Information Report NOR-X-366



Natural Resources
Canada

Canadian Forest
Service

Ressources naturelles
Canada
Service canadien
des forêts

Canada

The Canadian Forest Service's Northern Forestry Centre is responsible for fulfilling the federal role in forestry research and technology transfer in Alberta, Saskatchewan, Manitoba, and the Northwest Territories. The main objectives are research in support of improved forest management for the economic, social, and environmental benefit of all Canadians.

The Northern Forestry Centre is one of five centers of the Canadian Forest Service, which has its headquarters in Ottawa, Ontario.

Le Service canadien des forêts, Centre de foresterie du Nord, représente le gouvernement fédéral en Alberta, en Saskatchewan, au Manitoba et dans les Territoires du Nord-Ouest en ce qui a trait aux recherches forestières, et au transfert de technologie. Cet organisme s'intéresse surtout à la recherche en vue d'améliorer l'aménagement forestier afin que tous les Canadiens puissent en profiter aux points de vue économique, social et environnemental.

Le Centre de foresterie du Nord constitue l'un des cinq établissements du Service canadien des forêts, dont l'administration centrale est à Ottawa (Ontario).

Cover photos:

Photos courtesy of Canadian Forest Service personnel: Bonita McFarlane for the wildlife photos, Peter Boxall for the photo of two hunters, and Russ Bohning for the photo of the single hunter.

DESCRIPTIVE ANALYSIS OF HUNTING TRENDS IN ALBERTA

B.L. McFarlane, P.C. Boxall, and W.L. Adamowicz¹

INFORMATION REPORT NOR-X-366

**Canadian Forest Service
Northern Forestry Centre
1999**

¹ Department of Rural Economy, University of Alberta, Edmonton, Alberta T6G 2H1

© Her Majesty the Queen in Right of Canada, 1999
Catalogue No. Fo46-12/366E
ISBN 0-662-28074-1
ISSN 0704-7673

This publication is available at no charge from:

Natural Resources Canada
Canadian Forest Service
Northern Forestry Centre
5320 - 122 Street
Edmonton, Alberta T6H 3S5

A microfiche edition of this publication may be purchased from:

Micromedia Ltd.
240 Catherine Street, Suite 305
Ottawa, Ontario K2P 2G8



CANADIAN CATALOGUING IN PUBLICATION DATA

McFarlane, Bonita Lynn, 1956-

Descriptive analysis of hunting trends in Alberta

(Information report ; NOR-X-366)

Includes an abstract in French.

ISBN 0-662-28074-1

Cat. No. Fo46-12/366E

1. Hunting — Alberta — Public opinion. 2. Wildlife management — Alberta — Public opinion. 3. Wildlife conservation — Alberta — Public opinion.
4. Hunting surveys — Alberta. I. Boxall, Peter Charles. II. Adamowicz, Wiktor, L., 1959-. III. Northern Forestry Centre (Canada). IV. Series: Information report (Northern Forestry Centre (Canada)) ; NOR-X-366. V. Title.

SK152.A3M23 1999 799.297123 C99-980299-2



This report has been printed on Canadian recycled paper.

McFarlane, B.L.; Boxall, P.C.; Adamowicz, W.L. 1999. Descriptive analysis of hunting trends in Alberta. Nat. Resour. Can., Can. For. Serv., North. For. Cent., Edmonton, Alberta. Inf. Rep. NOR-X-366.

ABSTRACT

Alberta, like other jurisdictions in North America, has experienced a decline in hunting participation. In Alberta this decline has been occurring since the early 1980s. Studies examining why hunting has declined in North America have cited social, social-psychological, institutional, and environmental factors as playing key roles. A study was undertaken in 1997 to examine the factors influencing hunting participation in Alberta. A questionnaire was sent by mail to 1000 residents who had purchased a wildlife certificate between 1991 and 1996. The 758 respondents were classified as occasional or committed hunters. Occasional hunters (11.2% of the sample) had not hunted at least 1 year from 1991 to 1996 or did not intend to hunt in 1997. Committed hunters (88.8%) had hunted every year since 1991 and intended to hunt in 1997. Socialization factors during initiation into hunting were not associated with hunting involvement. The proportions of occasional hunters living in urban areas, having a university education, and having household incomes of at least \$70 000 were greater than the corresponding proportions of committed hunters. Achievement-oriented reasons for hunting such as getting a supply of meat were less important for occasional hunters than for committed hunters. The most important reasons for not hunting were not enough time, cost of licenses, and complicated hunting regulations.

RÉSUMÉ

Comme partout ailleurs, le nombre de chasseurs a décliné en l'Alberta au cours de ces dernières années. Dans le cas de l'Alberta, ce déclin a débuté au début des années 80. Les études portant sur les raisons d'un tel déclin ont conclu que les facteurs sociaux, sociaux-psychologiques, institutionnels et environnementaux jouaient tous un rôle fondamental. En 1997, nous avons entrepris d'examiner les facteurs qui influent sur l'activité de chasse en Alberta en envoyant un questionnaire à 1 000 résidents qui avaient acheté un permis de chasse (wildlife certificate) entre 1991 et 1996. Nous avons classé les 758 répondants comme étant soit chasseur occasionnel soit chasseur passionné. Les chasseurs occasionnels (11,2 % de l'échantillon) n'ont pas chassé au moins une année entre 1991 et 1996 ou prévoyaient de ne pas chasser en 1997. Les chasseurs passionnés (88,8 % de l'échantillon) ont chassé tous les ans depuis 1991 et prévoyaient de chasser en 1997. Les facteurs liés à l'aspect social de la chasse dans la phase d'initiation ne paraissent pas être liés au degré d'engagement dans l'activité. La proportion des chasseurs vivant dans les zones urbaines, ayant suivi des études universitaires et ayant des revenus supérieurs ou égaux à 70 000 \$ était plus grande chez les chasseurs occasionnels que chez les chasseurs passionnés. La réalisation d'un objectif spécifique, tel que l'acquisition de viande, s'est révélée moins importante pour les chasseurs occasionnels que pour les passionnés. Les principales raisons invoquées par les chasseurs pour justifier leur non-participation à une saison de chasse étaient le manque de temps, le coût des permis de chasse et la complexité des règlements régissant la chasse.

CONTENTS

INTRODUCTION	1
Hunting Trends in Alberta	1
Factors in Hunting Decline	2
METHODS	6
RESULTS	7
Hunting Activity	7
Socialization into Hunting	7
Reasons for Not Hunting	8
Reasons for Hunting	8
Attitudes toward Hunting	8
Demographics	12
DISCUSSION	12
ACKNOWLEDGMENTS	14
REFERENCES	14

FIGURES

1. Wildlife certificate sales in Alberta, 1965-96	1
2. Hunting license sales in Alberta, 1985-96	2
3. Stages of involvement in hunting	3
4. Distribution of the Alberta population, 1961-91	4
5. Price of wildlife certificates in Alberta, 1965-96	4
6. Fees for general hunting licenses in Alberta, 1965-97	5

TABLES

1. Distribution of hunting history from 1991 to 1996	7
2. Distribution of hunter activity from 1991 to 1996	7
3. Distribution of hunters participating with various social groups during hunting initiation	8
4. Reasons for not hunting, as rated by occasional hunters	9

5. Reasons for hunting, as rated by all respondents	10
6. Reasons for hunting, as rated by committed and occasional hunters	11
7. Attitudes toward hunting among all respondents	13
8. Demographic characteristics of respondents	13

NOTE

The exclusion of certain manufactured products does not necessarily imply disapproval nor does the mention of other products necessarily imply endorsement by Natural Resources Canada.

Hunting Trends in Alberta

Alberta has experienced a decline in hunting participation since the 1980s. The percentage of the population participating in hunting has declined from about 11.4% in 1981 (Filion et al. 1985) to 7.1% in 1991 (Filion et al. 1993). Although these percentages may be inflated (Boxall 1990), the decline in hunting is also apparent in the sales of wildlife certificates and hunting licenses recorded by Alberta Environmental Protection. Wildlife certificates are mandatory for anyone who wishes to purchase a hunting license for the province of Alberta. Certificate sales peaked in 1980 at about 165 000 and declined to approximately 95 000 in 1996, a decrease of about 42% (Fig. 1). Sales of hunting licenses for most big game have also decreased since the 1980s (Fig. 2). For example, sales of moose licenses including special licenses issued through a lottery system, have declined from about 60 000 in 1985 to fewer than 30 000 in 1996. The declines in the proportion of the population participating in hunting and in license sales are not unique to Alberta but have been

occurring in most provinces (Filion et al. 1993) and the United States (Heberlein and Thomson 1996).

Decreased participation is a concern because of declining revenues from license sales and the potential impact on the success of wildlife management programs and strategies. Many wildlife conservation programs are supported by revenue generated from license sales or through hunters' memberships in and donations to private conservation organizations. For example, in Alberta a portion of hunting license fees is used to support programs such as Buck for Wildlife, and hunters are strong supporters of conservation organizations such as Ducks Unlimited. Thus, the trend of reduced license sales and revenue may lead to a reduction in funding of conservation programs, and the reduction in the number of hunters may lead to fewer donations to conservation organizations (Yen et al. 1997).

Many wildlife management strategies are based on the demand for game species. As this

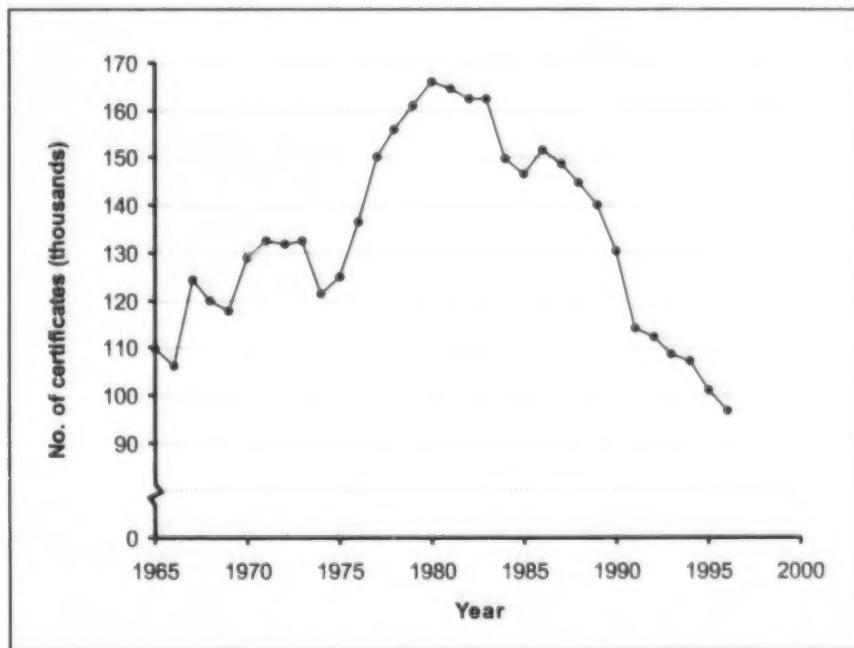


Figure 1. Wildlife certificate sales in Alberta, 1965–96. Source: Alberta Environmental Protection.

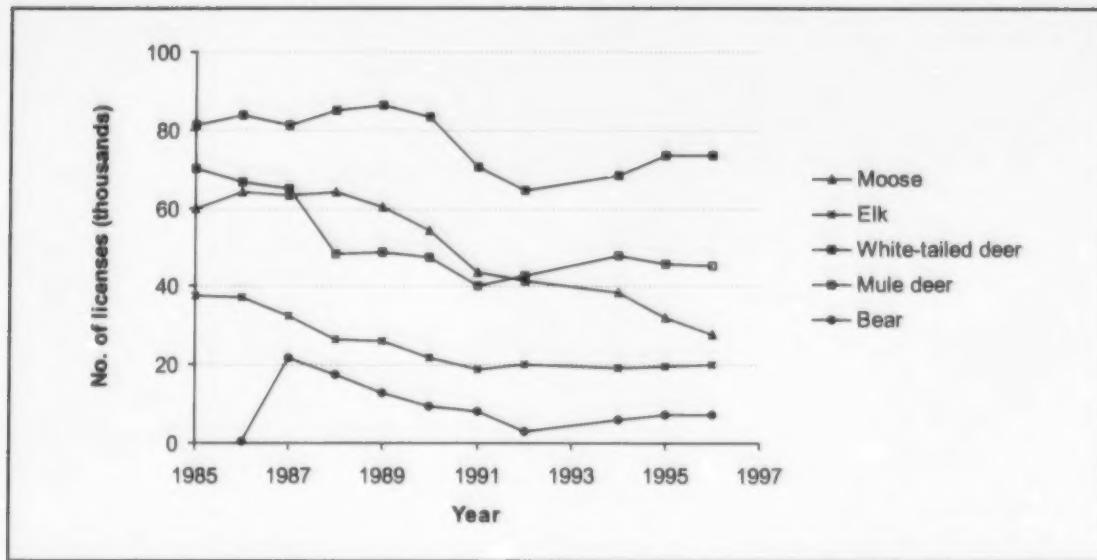


Figure 2. Hunting license sales (including special draws) in Alberta, 1985–96. Source: Alberta Environmental Protection.

demand decreases, management strategies may no longer be effective, which could result in overpopulation of some species. Increases in wildlife populations could lead to more winter die-offs of wildlife, conflicts between agriculturalists, urban landowners, and wildlife, more collisions between wildlife and vehicles, increased risk of transmission of diseases to humans, and a decline in the economic activity associated with the hunting industry (Purdy and Decker 1989; Stelfox and Wasel 1993). Thus, understanding why hunting participation is declining is important for retaining an active hunter population for management purposes, diminishing the impact of reduced funds on conservation programs, and maintaining economic opportunities.

Factors in Hunting Decline

The decline in hunting participation has been a concern among many wildlife agencies in North America. Studies examining why hunting is declining have cited social, social-psychological, institutional, and environmental factors as playing key roles.

Decker et al. (1987) proposed a model of hunting participation. The model includes several stages of involvement, from awareness of hunting, to gaining interest, to trying the activity, and finally to adopting and continuing it (Fig. 3). Dropping in and

out of hunting or deserting the activity completely can occur at any time. Although factors influencing the adoption stage and early involvement have been well documented (for example, Applegate 1989, Purdy et al. 1989), factors that influence desertion after many years of continued involvement have not received as much attention in the literature.

The most important factors in adopting and continuing hunting for at least 5 years appear to be related to the socialization of new hunters into the hunting fraternity. Experiencing hunting at an early age and having family members who hunt and are supportive of hunting during the adoption phase appear to be important factors in long-term hunting participation. People who begin hunting with family and are exposed to hunting-related experiences before the age of 16 years are less likely to drop out of hunting within 5 years than those who take up hunting later in life or do not hunt with family members (Applegate 1989; Purdy et al. 1989). This socialization process indicates the importance of early hunting experiences with role models in the recruitment of new hunters, the development of hunting skills and positive attitudes toward hunting, and the continuation of hunting activity. Factors that influence dropping out of hunting after many years in the continuation stage may differ from those that influence initial adoption. For

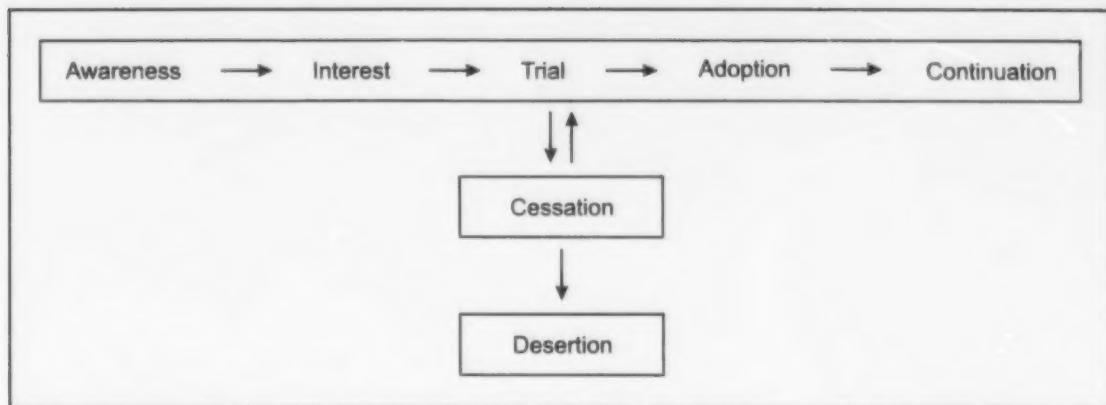


Figure 3. Stages of involvement in hunting (adapted from Decker et al. 1987; Decker and Purdy 1986).

example, institutional and environmental factors may become more important later in the hunting career than the influence of role models.

Changes in the demographics of the North American population may also be affecting participation (for example, Manfredo and Zinn 1996). Hunting has generally been associated with rural life, and rural residents make up a large proportion of the hunting population (Boxall and Smith 1986; Purdy et al. 1989). Increased urbanization across North America means that there are fewer rural residents to carry on the hunting tradition and urban residents have farther to travel to reach hunting areas; in addition, urbanization is associated with less social support for hunting activities (Kellert 1978). In Alberta, the rural population has remained relatively constant, but urban centers have experienced steady expansion since 1961 (Fig. 4). This increased urbanization may be having an impact on hunting participation. Other demographic changes that have been associated with declines in hunting include the age and education of the population. The Canadian population is aging, so there are fewer young people available to carry on hunting, and as current hunters age they become less dedicated and spend less time and money on hunting (Boxall and Smith 1986). As education levels increase fewer people take up hunting, for example, university graduates are underrepresented in the hunter population (Boxall et al. 1991; Filion et al. 1992).

Social-psychological factors influencing participation include attitudes toward hunting, the goals and expectations of hunters, and satisfaction with

the hunting experience. Public attitudes toward hunting have shifted to reflect a more antihunting sentiment, which has made hunting a socially unacceptable activity for many (Kellert 1978). This shift in public attitudes suggests that hunters are receiving less social support from family and peers and that many people do not consider hunting an activity in which they want to participate.

Having unsatisfactory hunting experiences may influence a hunter's decision to quit hunting. Satisfaction with the hunting experience may depend on how successful hunters are at achieving a desired goal or psychological experience (Driver 1985). Hunting goals have been classified into three broad categories: appreciative (for example, enjoying nature), affiliative (for example, being with family and friends), and achievement (for example, obtaining a supply of meat) (Decker and Connelly 1989). If such goals are not met, hunters may become dissatisfied and drop out of hunting.

Institutional factors that might influence participation include the cost of hunting licenses and the complexity of hunting regulations. In Alberta, the cost of wildlife certificates (Fig. 5) and big game licenses (Fig. 6) has increased substantially since the 1980s, and this increase may be having a negative impact on hunter participation. Hunting regulations have become more complex. For example, as an indicator of regulation complexity, the number of types of hunting licenses increased from 12 in 1965 to 35 in 1995, and the number of special draw licenses increased from 7 to 16 during the same period. The book explaining the regulations has

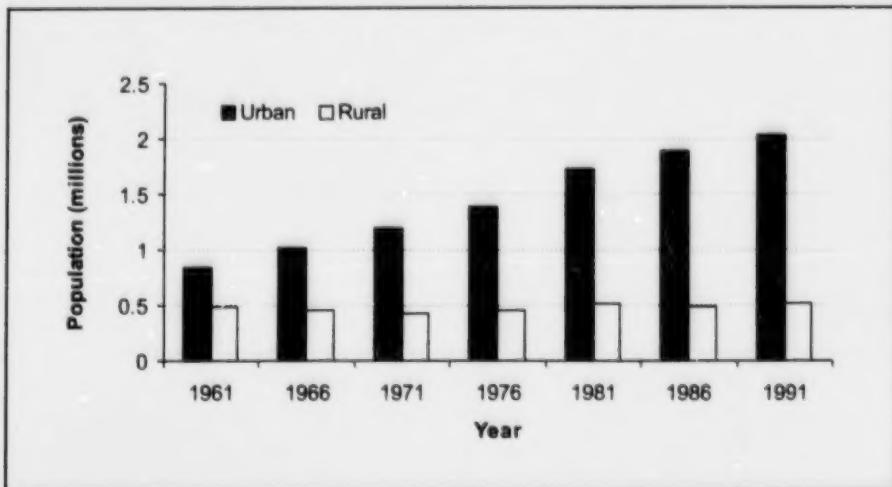


Figure 4. Distribution of the Alberta population, 1961–91. Source: Statistics Canada census data.



Figure 5. Price of wildlife certificates in Alberta, 1965–96. Source: Alberta Environmental Protection.

also become more complex. For example, the number of tables, which summarize important changes and legal requirements, increased from 6 in the 1970s to 16 in the early 1990s.

Environmental factors that might influence participation include the availability of wildlife habitat, accessibility to hunting areas, and other activities occurring on the land base. Industrial activities such as forestry or oil and gas development may

increase or improve access to hunting areas and affect wildlife habitat. Logging roads and seismic lines can open up new hunting opportunities. However, increased access may result in a greater concentration of hunters in an area. This, in turn, could lead to a sense of crowding and congestion, which could diminish satisfaction with the hunting experience and cause dissatisfied hunters to drop out of hunting. Although some logging activities might improve big game habitat, large clear-cuts can

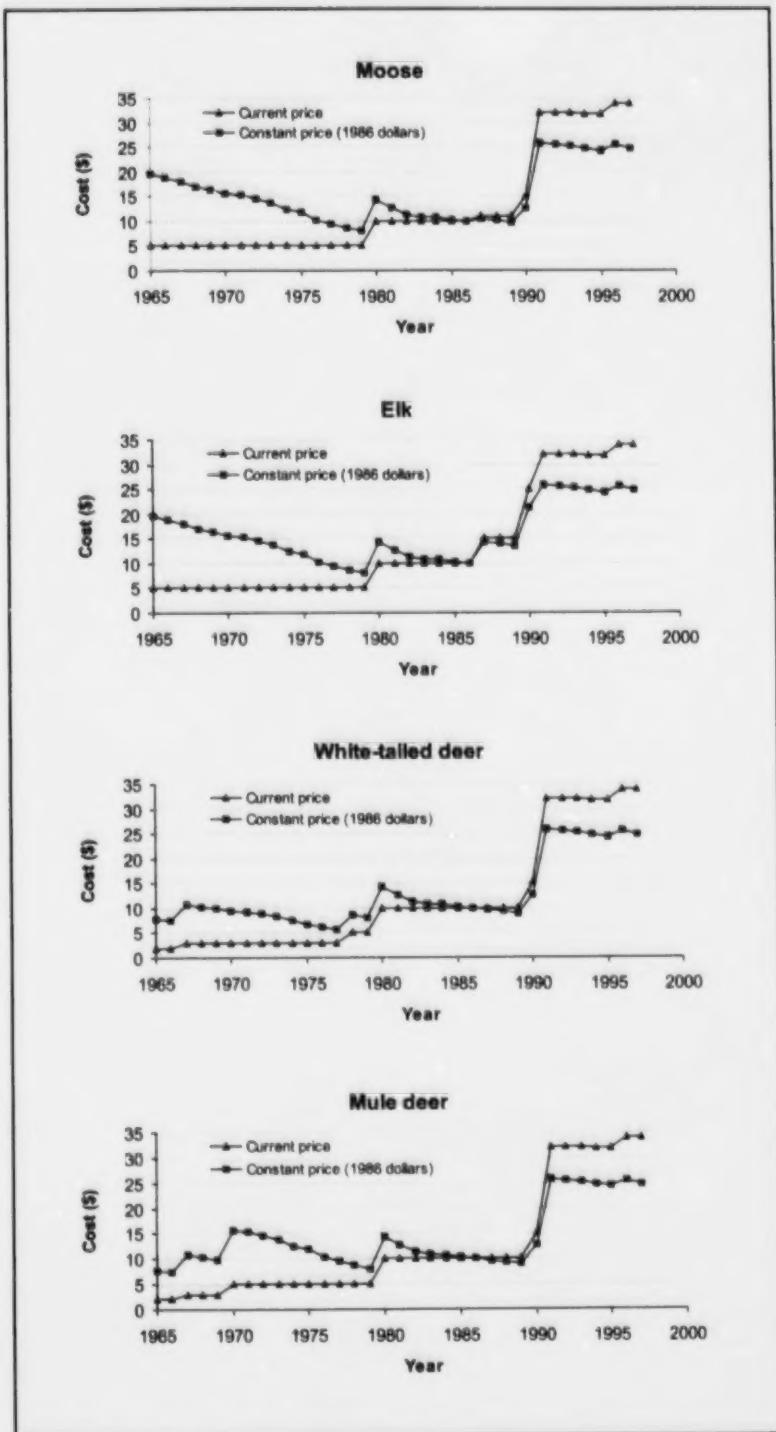


Figure 6. Fees for general hunting licenses in Alberta, 1965–97. Source: Alberta Environmental Protection.

change the landscape and diminish the visual quality or scenic beauty of an area and thus have impact on the hunting experience.

A study was undertaken in 1997 to examine the factors affecting the decline in hunting participation in Alberta. Specifically, the objectives were to examine the factors influencing people to take up hunting, the reasons why people quit hunting, and hunters' attitudes toward hunting.

A sample of 1000 Alberta residents who had purchased a wildlife certificate between 1991 and 1996 was drawn at random from the hunter data base maintained by Alberta Environmental Protection. Wildlife certificates are mandatory for anyone who wishes to purchase a hunting license. Once a certificate is issued to a hunter, the hunter retains the same certificate number and remains in the data base even if a hunting license is not purchased or the certificate is not renewed. Thus, the data base contains a record of everyone who has ever purchased a hunting license and includes people who no longer hunt. A total of 228 128 Albertans were registered in the data base in 1996.

A questionnaire was mailed to the 1000 residents in June 1997. About 1 week later a reminder postcard was sent, and about 4 weeks after the initial mailing a second questionnaire was sent to those who had not yet responded. An incentive of a prize draw for one of twenty \$25 gift certificates from an outdoor-hardware store was used to encourage a response.

The questionnaire collected information on factors that influence people to take up hunting, such as their age when they first started hunting, who they hunted with, and where they lived while growing up, specifically in an urban or rural environment. Involvement in big game hunting from 1991 to 1996 was determined by the number of days spent hunting each year and the intention to hunt in 1997.

Respondents who had not hunted big game in at least 1 year from 1991 to 1996 or did not intend to hunt in 1997 were asked to rate 17 reasons for not hunting on a five-point scale ranging from "not at all important" to "very important". Reasons

This report presents a descriptive analysis of results from a mail survey. It provides summaries of the data and compares two groups of hunters who have adopted hunting but represent different levels of involvement. This segmentation scheme was used to determine if the two groups differed in terms of socialization influences during initiation into hunting, reasons for hunting, attitudes toward hunting, and demographics.

METHODS

included environmental factors such as "wildlife populations are too low", social factors such as "people who are important to me do not approve of my hunting", and institutional factors such as "hunting licenses cost too much".

Respondents were asked to rate 11 reasons for hunting on a five-point scale ranging from "not at all important" to "very important". These were based on Decker and Connelly's (1989) motivations for hunting and included appreciative reasons such as "getting outdoors to enjoy nature", affiliative reasons such as "being with hunting companions", and achievement reasons such as "getting a supply of meat".

Attitudes toward hunting were assessed with seven statements that primarily reflect the potential benefits of hunting. Respondents were asked to rate the statements on a five-point scale ranging from "strongly disagree" to "strongly agree".

Demographic information was collected on respondent's, age, gender, number and age of people living in the household, area of residence, membership in hunting and conservation organizations, education, and 1996 household income.

To examine factors associated with a decline in hunting participation, the sample was divided into committed hunters and occasional hunters. Occasional hunters were those who had not hunted big game in at least 1 year from 1991 to 1996 or who did not intend to hunt big game in 1997. The committed hunters consisted of respondents who had hunted big game every year from 1991 to 1996 and intended to hunt big game in 1997.

RESULTS

A total of 758 questionnaires were returned. After adjustment for questionnaires that could not be delivered, this represented a 78.1% response rate.

Hunting Activity

Committed hunters, those who had hunted in all 6 years from 1991 to 1996 and intended to hunt in 1997, constituted 640 (88.8%) of the respondents. Occasional hunters, those who had not hunted in at least 1 year or did not intend to hunt in 1997, constituted 81 (11.2%) of the respondents. Only 11 (1.5%) had not hunted since 1991 (Table 1). Thirty-seven respondents could not be classified as committed or occasional hunters because of missing data. Respondents were relatively consistent in terms of the number of days they hunted big game each year (Table 2). Most respondents had hunted either 1-7 days or 8-14 days from 1991 to 1996. Responses concerning hunting intentions for 1997 showed that 3.2% did not intend to hunt, down slightly from the 5% who did not hunt in 1996. Although the response rate for the survey was high (78.1%), those who did not respond may represent hunters who have the least interest in hunting or who have dropped out of hunting (Brown and Wilkins 1978). Resources did not permit further contact with nonrespondents to determine their level of hunting involvement or reasons for not hunting.

Socialization into Hunting

Forty-two percent of respondents had taken a hunter training course. The mean age when they

Table 1. Distribution of hunting history from 1991 to 1996

No. of years hunted	No. (and %) of respondents (<i>n</i> = 751)
0	11 (1.5)
1	6 (0.8)
2	5 (0.7)
3	6 (0.8)
4	10 (1.3)
5	31 (4.1)
6	682 (90.8)

Frequency missing = 7.

took the course was 20.0 years, and the mean age when they purchased their first hunting license was 17.6. On average, it had been 26.6 years since respondents had purchased their first license, which suggested that most were not new to hunting. There were no differences between the committed and occasional hunters in terms of the proportion who had taken a training course, the age at which the course was taken, the age at which the first license was purchased, and the number of years since the purchase of the first license.

Most respondents indicated that they had received social support for their hunting activities when they first started hunting, 96.5% reporting that people who were important to them approved of their hunting. When respondents were growing up, about 79.5% had a family member who hunted. No differences were observed between the committed and occasional hunters on these factors.

During respondent's initiation into hunting, most (54.2%) hunted with a parent (Table 3). The next most common hunting companions were friends (43.3%), group of friends (31.1%), and relatives other than parent, grandparent, or spouse (27.7%). No differences were observed between the committed and occasional hunters in terms of the social groups with whom they hunted during initiation.

About 56% of the respondents had lived on a farm or in a rural area until they were at least 16 years old. More (57.4%) of the committed hunters had lived in these areas compared with the occasional hunters (46.2%) ($\chi^2 = 5.65$, df 2, *p* = 0.059).

Table 2. Distribution (%) of hunter activity from 1991 to 1996

Year	No. of days hunted					
	0	1-7	8-14	15-21	22-28	>28
1996	5.0	31.5	29.0	19.9	8.0	6.6
1995	3.7	26.9	33.0	20.4	8.6	7.4
1994	3.3	24.8	33.8	21.8	8.2	8.1
1993	4.4	25.0	31.3	22.4	8.3	8.6
1992	4.7	23.7	33.2	22.2	8.1	8.1
1991	4.9	25.3	32.8	21.1	8.0	7.9

Table 3. Distribution of hunters participating with various social groups during hunting initiation

Social group	No. (and %) of committed hunters	No. (and %) of occasional hunters	No. (and %) of total sample
Parent	347 (54.2)	44 (54.3)	391 (54.2)
Grandparent	52 (8.1)	5 (6.2)	57 (7.9)
Spouse	17 (2.7)	3 (3.7)	20 (2.8)
Other relative	180 (28.1)	20 (24.7)	200 (27.7)
Group of relatives	76 (11.9)	13 (16.1)	89 (12.3)
A friend	278 (43.4)	34 (42.0)	312 (43.3)
Group of friends	199 (31.1)	25 (30.9)	224 (31.1)
Group of family and friends	114 (17.8)	11 (13.6)	125 (17.3)
Other (e.g., alone)	29 (4.5)	4 (4.9)	33 (4.6)

Reasons for Not Hunting

Only three of the reasons for not hunting were rated as important by the majority of occasional hunters (Table 4). The most common reason for not hunting was that hunting licenses cost too much. Sixty-four percent of occasional hunters rated this as an important reason. The next most common reason was not enough time because of work or family responsibilities, with 55% rating this as important. Fifty-two percent rated the difficulty of getting permission to hunt on private or leased land as an important reason for not hunting. The following factors were rated as not important by the majority of respondents: disapproval of people who are important to the respondent, distance of hunting areas from home, lack of physical ability, lack of hunting companions, dislike of killing animals, lack of skills and experience, concern for safety, lack of success at bagging game, and lack of knowledge of where to hunt. Factors rated as neutral were changes to hunting areas because of industrial and grazing activities and high cost of equipment and supplies. Respondents were about equally divided concerning the complexity of hunting regulations. About 45% rated this factor as not important and 43% rated it as important (mean response 2.86).

Sixty occasional hunters also indicated which of the reasons was the most important to them. Eighteen (30.0%) indicated that lack of time was the most important reason for not hunting, 12 (20.0%) indicated that the cost of hunting licenses is too high, and 6 (10.0%) indicated that the hunting regulations are too complicated. Lack of physical ability, difficulty in getting permission to hunt on private or leased land, high numbers of hunters in the

woods, and changes to hunting areas because of industrial or grazing activities were each ranked as most important by 3 (5.0%) of respondents. All other reasons were ranked as most important by less than 5% of respondents.

Reasons for Hunting

Reasons related to the appreciative aspects of the hunting experience were generally rated more important than reasons related to affiliative or achievement aspects (Table 5). With the exception of use of my hunting skills, the achievement-oriented reasons, although important, were rated as less important than appreciative and affiliative reasons.

Differences were observed between the committed and the occasional hunters for four of the reasons for hunting (Table 6). The occasional hunters rated three achievement-oriented reasons (getting a supply of meat, using hunting skills, and shooting a trophy animal) and one appreciative reason (enjoying the peace and solitude of the bush) as less important than did the committed hunters. This suggests that the less-active group of hunters may be seeking a different experience than the more committed group. For the occasional hunter the stalking and killing aspects of hunting may be of secondary importance to experiencing nature and being with companions.

Attitudes toward Hunting

Overall, the respondents had positive attitudes toward hunting, believing that hunting provides a positive way to interact with nature and a humane

Table 4. Reasons for not hunting, as rated by occasional hunters

Reason	Distribution of ratings ^a (%)			Mean ^a (and SD) rating
	Not important	Neutral	Important	
People who are important to me do not approve of my hunting	73.0	18.0	9.0	1.74 (1.11)
Hunting licenses cost too much	28.7	7.4	63.9	3.52 (1.44)
It is too far from my home to hunting areas	59.5	13.5	27.0	2.19 (1.37)
Hunting regulations are too complicated	44.6	12.0	43.4	2.86 (1.65)
I do not have the physical ability to hunt	81.1	8.9	10.0	1.63 (1.25)
I do not have the time because of work or family responsibilities	34.1	11.4	54.5	3.14 (1.63)
I do not have people to hunt with	63.9	10.5	25.6	2.17 (1.50)
I do not like killing animals	60.3	26.1	13.6	2.03 (1.21)
I do not have the skills and experience required for hunting	84.7	8.2	7.1	1.47 (1.06)
It is too difficult to get permission to hunt on private or leased land	38.9	8.9	52.2	3.00 (1.66)
There are too many hunters in the woods	43.3	17.8	38.9	2.77 (1.51)
Hunting equipment and supplies cost too much	39.6	15.4	45.0	2.97 (1.57)
I do not feel safe in the woods during hunting season	52.8	13.5	33.7	2.48 (1.53)
I was not successful at bagging game	75.0	19.4	5.6	1.61 (1.02)
Wildlife populations are too low	45.4	14.8	39.8	2.64 (1.51)
Logging, grazing, or oil and gas activities have changed the areas where I liked to hunt	38.2	14.6	47.2	2.99 (1.61)
I do not know where to go to hunt	70.1	11.5	18.4	1.90 (1.36)

^a Rated on a scale of 1 to 5, where 1 = not at all important and 5 = very important. For this table, not important represents a rating <3, neutral represents a rating of 3, important represents a rating >3.

Note: SD = standard deviation.

Table 5. Reasons for hunting, as rated by all respondents

Reason	Distribution of ratings ^a (%)			Mean ^a (and SD) rating
	Not important	Neutral	Important	
Appreciative				
Getting outdoors to enjoy nature	0.7	1.7	97.6	4.78 (0.25)
Enjoying the peace and solitude of the bush	1.1	2.5	96.4	4.75 (0.57)
Seeing wildlife and signs of wildlife	1.6	3.5	94.9	4.64 (0.65)
Getting away from everyday problems and having a chance to relax	4.6	6.6	88.8	4.45 (0.89)
Affiliative				
Being with hunting companions	7.7	13.3	79.0	4.14 (1.06)
Strengthening relationships with family or friends	14.3	21.1	64.6	3.73 (1.22)
Achievement				
Using my hunting skills such as stalking and tracking	5.0	12.2	82.8	4.16 (0.92)
Getting a supply of meat	17.2	20.6	62.2	3.63 (1.22)
Having a chance to use my hunting equipment	16.4	26.9	56.7	3.53 (1.14)
Getting shots at big game	25.4	28.8	45.8	3.22 (1.28)
Shooting a trophy animal	36.2	26.3	37.5	2.89 (1.40)

^a Rated on a scale of 1 to 5, where 1 = not at all important and 5 = very important. For this table, not important represents a rating <3, neutral represents a rating of 3, important represents a rating >3.

Note: SD = standard deviation.

Table 6. Reasons for hunting, as rated by committed and occasional hunters

Reason	Mean rating ^a		Statistics	
	Committed hunters	Occasional hunters	t value	p
Appreciative				
Getting outdoors to enjoy nature	4.78	4.81	0.44	0.6563
Enjoying the peace and solitude of the bush	4.77	4.60	-2.44	0.0150
Seeing wildlife and signs of wildlife	4.65	4.65	0.05	0.9613
Getting away from everyday problems and having a chance to relax	4.45	4.40	-0.40	0.6889
Affiliative				
Being with hunting companions	4.14	4.25	0.76	0.4506
Strengthening relationships with family or friends	3.76	3.66	-0.66	0.5092
Achievement				
Using my hunting skills such as stalking and tracking	4.21	3.96	-2.36	0.0186
Getting a supply of meat	3.65	3.18	-3.25	0.0012
Having a chance to use my hunting equipment	3.54	3.38	-1.12	0.2629
Getting shots at big game	3.25	3.09	-0.99	0.3218
Shooting a trophy animal	2.96	2.53	-2.46	0.0158

^a Rated on a scale of 1 to 5, where 1 = not at all important and 5 = very important.

way to control wildlife populations (Table 7). About half (50.7%) agreed that hunting is an important way to carry on family traditions, and very few respondents (11.5%) agreed that animals have no defense against hunters. A comparison of occasional and committed hunters showed that they differed on only one attitude statement: occasional hunters agreed more (mean score 2.37) than committed hunters (mean score 2.11) that animals have no defense against hunters ($t = 2.12$, df 712, $p = 0.0342$).

Demographics

The respondents were predominantly men (97.2%), 20.8% had at least some university education, and 43.5% had household incomes of \$70 000 or more (Table 8). The mean age was 44.4 years. On average, households consisted of 2.88 people and had 0.85 members 16 years old or younger. About

42% lived on a farm or in a rural area and 23.6% lived in an area with a population of 100 000 or more. In terms of conservation activity, 29.9% belonged to a hunting or fishing organization and 14.3% belonged to other conservation organizations such as the Canadian Wildlife Federation, Alberta Wilderness Association, and Greenpeace.

Differences were observed between the committed and occasional hunters in terms of place of current residence, place of residence during childhood, education, and income. A greater proportion of occasional than committed hunters lived in an urban area with a population of at least 100 000 (38.8% and 21.75%, respectively), grew up in an urban environment (23.1% and 13.9%), had a university education (30.9% and 19.5%), and had household incomes of \$70 000 or more (52.9% and 42.4%).

DISCUSSION

Committed hunters represent a group with many years of hunting experience (as indicated by the number of years since they purchased their first license) and who continue to hunt each year. Although the occasional hunters are also very experienced, they do not hunt every year and some have not hunted for at least 6 years. Occasional hunters probably represent those who have tried hunting and continued to hunt for several years but now have the potential to drop out of hunting completely.

Occasional and committed hunters appeared to have had similar socialization influences during initiation into hunting. Most received social support for their hunting activities from people who were important to them, on average they purchased their first hunting license at about the same age, and they hunted with the same social groups, with a parent being the dominant hunting companion. Socialization influences are important in the initial adoption of hunting and in sustaining hunting activity for at least 5 years (Applegate 1989; Purdy et al. 1989). Our study consisted primarily of hunters who had, on average, over 25 years of experience, which suggests that they had adopted hunting but that other factors might be causing them to reconsider their involvement in hunting. Desertion from hunting at this late stage of involvement might be

associated with different factors than those associated with desertion during adoption and the early stages of continued activity.

Reasons for not hunting that were ranked as the most important by occasional hunters were lack of time, cost of licenses, and complexity of hunting regulations. Management agencies can do little to alter time available for hunting; however, they can alter license fees and regulations. About 30% of occasional hunters cited these as the most important reasons for not hunting. If agencies could influence the behavior of 30% of potential drop outs, there could be a substantial impact on the number of active hunters and the retention of experienced hunters capable of recruiting new people into the activity.

Like others who have studied reasons for hunting (for example, Decker and Connelly 1989), we found that appreciative and affiliative reasons were rated as more important than achievement reasons. Overall, hunting seems to represent a chance to enjoy nature with family and friends. Achievement reasons were less important for occasional hunters than for committed hunters, which indicates that occasional hunters might view hunting as an excuse to get into the bush with family and friends and to enjoy nature, with the actual stalking, tracking, and

Table 7. Attitudes toward hunting among all respondents

Statement	Distribution of ratings ^a (%)			Mean ^a (and SD) rating
	Disagree	Neutral	Agree	
Hunting enables people to enjoy the outdoors	2.2	2.1	95.7	4.52 (0.70)
Hunting wildlife is acceptable if the number of animals does not decline	2.5	6.3	91.3	4.43 (0.77)
Hunting helps people appreciate nature	3.6	9.9	86.5	4.30 (0.82)
Hunting is a humane way to control wildlife populations	4.1	14.2	81.6	4.20 (0.88)
Hunting is an important way to carry on family traditions	10.8	38.5	50.7	3.59 (1.04)
Hunting teaches people about nature	3.4	9.4	87.2	4.28 (0.79)
Animals have no defense against hunters	68.9	19.6	11.5	2.17 (1.05)

^a Rated on a scale of 1 to 5, where 1 = strongly disagree and 5 = strongly agree. For this table, disagree represents a rating <3, neutral represents a rating of 3, agree represents a rating of >3.

Note: SD = standard deviation.

Table 8. Demographic characteristics of respondents

Variable	Committed hunters	Occasional hunters	χ^2 /or <i>t</i> value	<i>p</i>	Total sample
Men (%)	96.3	97.2	0.19	0.657	97.1
Current residence (% urban ^a)	21.7	38.8	11.77	0.003	23.6
Residence before 16 yr old (% urban ^a)	13.9	23.1	5.65	0.059	14.9
Hunting organization member (%)	30.8	23.5	1.83	0.176	29.9
Conservation organization member (%)	13.9	17.3	0.067	0.413	14.3
University education (%)	19.5	30.9	5.64	0.018	20.8
Household income ≥\$70 000 (%)	42.4	52.9	2.80	0.094	43.5
Mean age (yr)	44.3	44.6	0.215	0.830	44.4
Mean no. of household members	2.90	2.85	-0.226	0.823	2.88
Mean no. of household members ≤16 yr old	0.86	0.79	-0.593	0.555	0.85

^a Proportion living in an area with a population of 100 000 or more.

shooting of game being of secondary importance. Managing wildlife and the forests to supply game may not be adequate to meet the needs of many hunters. Planning of hunting opportunities should include managing species in particular settings (specifically, biophysical, social and managerial settings) to produce hunters' desired psychological outcomes (Driver 1985). Psychological outcomes refer to the goals or motivations of hunters and reflect the types of hunting experiences being sought. Goal attainment is an integral component in satisfactory hunting experiences. It is the combination of biophysical, social, and managerial settings that provides opportunities for hunters to achieve the desired psychological outcomes. The biophysical setting refers to the physical environment in which the hunt occurs. It includes the remoteness of the area, the species available, and wildlife populations. The management setting refers to aspects such as regulations, access to hunting areas, and facilities and services. The social setting refers to the social conditions such as the concentration of hunters and the types of hunters in an area. By managing for the type of hunting experience being sought, managers might influence the continued participation of hunters. If hunters are not able to achieve their desired goals or psychological experiences, they may become dissatisfied and drop out of hunting. Perhaps some of these experiences could be achieved through the careful design and management of lottery hunts. For example,

the Camp Wainwright deer hunt represents a unique hunting opportunity in Alberta because hunter numbers are limited, opportunities for multiple harvests are allowed, the hunt is held at a unique time of the year, and limits are put on equipment used.

The demographic data show that a greater proportion of occasional hunters than of committed hunters grew up in an urban setting, were living in an urban setting, were better educated, and had higher incomes. This suggests that urbanization and demographics may be influencing participation.

In summary, our results suggest that institutional factors (fees and regulations), types of hunting experiences being sought, and demographics might be important factors influencing hunting participation. Future analysis will include the development of models to examine these and environmental factors in a multivariate analysis to determine which factors are having the greatest impact on participation. Although this study has provided some insight into why hunting participation is declining in Alberta, many questions remain. For example, the respondents included very few people who had dropped out of hunting completely. An in-depth study of these people might reveal different influences and reasons for quitting than those associated with the potential drop outs in the current study.

ACKNOWLEDGMENTS

The authors thank Carol Trowsdale, Sally MacSephney, Don Meredith, Sylvia Birkholz, and Harold Carr, Alberta Environmental Protection, for their assistance in obtaining the sample of hunter's and for providing trend information. The authors thank Mandy Fisher for technical assistance.

Special thanks is extended to the many hunters who participated in the study. Partial funding was provided by the Sustainable Forest Management Network of Centres of Excellence and the Foothills Model Forest.

REFERENCES

- Applegate, J.E. 1989. Patterns of early desertion among New Jersey hunters. *Wildl. Soc. Bull.* 17:476-481.
- Boxall, P.C. 1990. How many hunters are there? A comparison of estimates from different sources with implications for estimating illegal activities. *J. Wildl. Law Enforc.* 2:16-19.
- Boxall, P.C.; DuWors, E.; Filion, F.L. 1991. Trends and factors influencing participation in recreational hunting in Canada: a dynamic model. Pages 658-669 in S. Csanyi and J. Ernhaft, eds. *Trans. XXth Congr. Int. Union Game Biol.*, August 21-26, 1991, Gödöllö, Hungary. Part 2. Univ. Agric. Sci., Gödöllö, Hungary.
- Boxall, P.C.; Smith, L.C. 1986. Characteristics of Alberta's hunters. Dep. For. Lands Wildl., Edmonton, Alberta. Occas. Pap. 1.
- Brown, T.L.; Wilkens, B.T. 1978. Clues for nonresponse, and its effect upon variable estimates. *J. Leis. Res.* 10:226-231.

- Decker, D.J.; Brown, T.L.; Driver, B.L.; Brown, P.J. 1987. Theoretical developments in assessing social values of wildlife: toward a comprehensive understanding of wildlife recreation involvement. Pages 76–95 in D.J. Decker and G.R. Goff, eds. *Valuing wildlife: economic and social perspectives*. Westview Press, Boulder, Colorado.
- Decker, D.J.; Connelly, N.A. 1989. Motivations for deer hunting: implications for antlerless deer harvest as a management tool. *Wildl. Soc. Bull.* 17:455–463.
- Decker, D.J.; Purdy, K.G. 1986. Becoming a hunter: identifying stages of hunting involvement for improving hunter education programs. *Wildl. Soc. Bull.* 14:474–479.
- Driver, B.L. 1985. Specifying what is produced by management of wildlife by public agencies. *Leisure Sci.* 7:281–295.
- Filion, F.L.; DuWors, E.; Boxall, P.; Bouchard, P.; Reid, R.; Gray, P.A.; Bath, A.; Jacquemot, A.; Legare, G. 1993. The importance of wildlife to Canadians: highlights of the 1991 survey. *Environ. Can.*, Ottawa, Ontario.
- Filion, F.L.; DuWors, E.; Boxall, P.; Reid, R.; Hobby, E.; Bouchard, P.; Gray, P.A.; Jacquemot, A. 1992. The importance of wildlife to Canadians in 1987: trends in participation in wildlife-related activities, 1981 to 2006. *Environ. Can.*, Ottawa, Ontario.
- Filion, F.L.; James, S.W.; Ducharme, J.L.; Pepper, W.; Reid, R.; Boxall, P.; Teillet, D. 1985. The importance of wildlife to Canadians: highlights of the 1981 national survey. *Environ. Can.*, Ottawa, Ontario.
- Heberlein, T.A.; Thomson, E. 1996. Changes in U.S. hunting participation, 1980–90. *Hum. Dimens. Wildl.* 1(1):85–86.
- Kellert, S.R. 1978. Attitudes and characteristics of hunters and antihunters. *Trans. North Am. Wildl. Nat. Resour. Conf.* 43:412–423.
- Manfredo, M.J.; Zinn, C. 1996. Population change and its implications for wildlife management in the new west: a case study of Colorado. *Hum. Dimens. Wildl.* 1(3):62–74.
- Purdy, K.G.; Decker, D.J. 1989. Applying wildlife values information in management: the Wildlife Attitudes and Values Scale. *Wildl. Soc. Bull.* 17:494–500.
- Purdy, K.G.; Decker, D.J.; Brown, T.L. 1989. New York's new hunters: influences on hunting involvement from beginning to end. Cornell Univ., Dep. Nat. Resour., Hum. Dimens. Res. Unit, Ithaca, New York. Ser. 89–3.
- Stelfox, J.B.; Wasel, S. 1993. Hunting and harvest. Pages 91–106 in J.B. Stelfox, ed. *Hoofed mammals of Alberta*. Lone Pine Publ., Edmonton, Alberta.
- Yen, S.T.; Boxall, P.C.; Adamowicz, W.L. 1997. An econometric analysis of donations for environmental conservation in Canada. *J. Agric. Res. Econ.* 22(2):246–263.